What is claimed is:

1. An apparatus for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses at least one channel, comprising:

channel coding means for encoding the source data to generate at least one data part and a control part;

code generating means for generating at least one spreading code to be allocated to the channel, wherein each spreading code is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal.

2. The apparatus as recited in claim 1, wherein said channel coding means includes:

spreading factor generation mean for generating a spreading factor related to the data rate of the data part.

3. The apparatus as recited in claim 2, wherein said code generating means includes:

control means responsive to the spreading factor, for

generating a code number for the channel; and

spreading code generation means responsive to the spreading factor and the code number, for generating the spreading code to be allocated to the channel.

4. The apparatus as recited in claim 3, wherein said control means generates a spreading factor and a code number related to the control part.

5. The apparatus as recited in claim 4, wherein said spreading code generation means generates a spreading code related to the control part in response to the spreading factor and the code number related to the control part.

6. The apparatus as recited in claim 5, wherein said spreading code generation means includes:

counting means for consecutively producing a count value in synchronization with a clock signal;

first logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the data part, to thereby generate the spreading code related to the data part; and

second logical operation means responsive to the count value for carrying out a logical operation with related to the control part, to thereby generate the spreading code related to the control part.

7. The apparatus as recited in claim 6, wherein said spreading code generation means further includes:

first selection means for outputting the spreading code related to the data part in response to a select signal as the spreading factor related to the data part; and

second selection means for outputting the spreading code related to the control part in response to a select signal as the spreading factor related to the control part.

8. The apparatus as recited in claim 7, wherein each of said first and second logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

9. The apparatus as recited in claim 8, wherein each of first and second logical operation means carries out a logical operation of $\prod_{i=0}^{N-2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

10. The apparatus as recited in claim 9, wherein said counting means includes an 8-bit counter when the 2^N is a maximum spreading factor.

11. The apparatus as recited in claim 10, wherein said first and second logical operation means include a plurality of AND gates and a plurality of exclusive OR gates, respectively.

12. The apparatus as recited in claim 11, wherein said first and second selection means include a multiplexer, respectively.

13. The apparatus as recited in claim 11, wherein said spreading means includes multipliers.

14. The apparatus as recited in claim 13, wherein said multipliers include:

first multiplier for multiplying the data part by the spreading code related to the data part; and

second multiplier for multiplying the control part by the spreading code related to the control part.

15. The apparatus as recited in claim 14, wherein said mobile station includes a data channel and a control channel.

16. The apparatus as recited in claim 15, wherein the spreading factor and the code number related to the control part are 256 and 0, respectively and wherein the control part is allocated to the control channel.

17. The apparatus as recited in claim 16, wherein the spreading factor related to the data part is 2^N where N = 2 to 8 and wherein the code number related to the data part is $2^N/4$ and wherein the data part is allocated to the data channel.

18. The apparatus as recited in claim 15, wherein said code generating means further includes;

signature generation means for generating a predetermined signature; and

scrambling code generation means for generating a scrambling code.

19. The apparatus as recited in claim 18, wherein the code numbers related to the data part and the control part are dependent on the predetermined signature, if the scrambling code is shared by multiple mobile stations and wherein the data part and the control part are allocated to the data channel and the control channel, respectively.

20. The apparatus as recited in claim 19, wherein the spreading factor related to the control part is 256 and wherein the code number related to the control part is 16(S-1)+15 where S = 1 to 16 and S is the predetermined signature.

21. The apparatus as recited in claim 20, wherein the spreading factor related to the data part is 2^N where N = 5 to 8 and wherein the code number related to the data part is $2^N(S-1)+15$.

22. The apparatus as recited in claim 1, wherein the spreading codes include an orthogonal variable spreading factor (OVSF) code.

23. The apparatus as recited in claim 1, further comprising:

scrambling means for scrambling the data and control parts and a scrambling code, to thereby rotate the two points.

24. The apparatus as recited in claim 23, wherein the two points includes a first point and a second point.

25. The apparatus as recited in claim 24, wherein the first and second points are rotated to clockwise and counterclockwise directions by a phase of 45°, respectively.

26. The apparatus as recited in claim 25, wherein a phase difference between the rotated first and second points is 90°.

27. The apparatus as recited in claim 24, wherein the first and second points are rotated to counterclockwise and clockwise directions by a phase of 45°, respectively.

28. The apparatus as recited in claim 27, wherein a phase difference between the rotated first and second points is 90°.

29. An apparatus for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses N number of channels where N is a positive integer, comprising:

channel coding means for encoding the source data to generate (N-1) number of data parts and a control part;

code generating means for generating N number of spreading codes to be allocated to the channels, wherein each spreading code is selected on the basis of a data rate of each data part and the control part and the spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data parts by using the spreading codes, to thereby generate the channel-modulated signal.

30. The apparatus as recited in claim 29, wherein said mobile station includes a control channel and six data channels.

31. The apparatus as recited in claim 30, wherein said six data channels include first, second, third, fourth, fifth and sixth data channels.

32. The apparatus as recited in claim 31, wherein the spreading code allocated to the control channel is represented by $C_{256,\ 0}$ made up of 1's.

33. The apparatus as recited in claim 32, wherein the spreading codes allocated to the first and second data channels are represented by $C_{4,\ 1}$ = {1, 1, -1, -1}, respectively.

34. The apparatus as recited in claim 33, wherein the spreading

codes allocated to the third and fourth data channels are represented by $C_{4,3} = \{1, -1, -1, 1\}$, respectively.

35. The apparatus as recited in claim 34, wherein the spreading codes allocated to the fifth and sixth data channels are represented by $C_{4,2} = \{1, -1, 1, -1\}$, respectively.

36. The apparatus as recited in claim 29, wherein the spreading codes include an orthogonal variable spreading factor (OVSF) code.

37. The apparatus as recited in claim 29, further comprising:

scrambling means for scrambling the data and control parts and a scrambling code, to thereby rotate the two points.

38. The apparatus as recited in claim 37, wherein the two points includes a first point and a second point.

39. The apparatus as recited in claim 38, wherein the first and second points are rotated to clockwise and counterclockwise directions by a phase of 45°, respectively.

40. The apparatus as recited in claim 39, wherein a phase difference between the rotated first and second points is 90°.

41. The apparatus as recited in claim 38, wherein the first and second points are rotated to counterclockwise and clockwise directions by a phase of 45°, respectively.

42. The apparatus as recited in claim 41, wherein a phase difference between the rotated first and second points is 90°.

43. A mobile station for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data, wherein the mobile station uses N number of channels where N is a positive integer, comprising:

channel coding means for encoding the source data to generate (N-1) number of data parts and a control part;

code generating means for generating N number of spreading codes to be allocated to the channels, wherein each spreading code is selected on the basis of a data rate of each data part and the control part and the spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data parts by using the spreading codes, to thereby generate the channel-modulated signal.

44. The mobile station as recited in claim 43, further comprising:

central processing unit coupled to said channel coding means;

user interface means coupled to the central processing unit for receiving a user input data from a user; and

source data generation means coupled to said channel coding

means for generating the source data.

45. The mobile station as recited in claim 44, further comprising:

frequency converting means coupled to said spreading means for converting the channel-modulated signal to a radio frequency signal; and

antenna for sending the radio frequency signal to a base station.

46. A method for converting source data to a channel- modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses at least one channel, comprising the steps of:

a) encoding the source data to generate at least one data part and a control part;

b) generating at least one spreading code to be allocated to the channel, wherein each spreading code is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on same point or symmetrical with respect to a zero point on a phase domain; and

c) spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal.

47. The method as recited in claim 46, wherein said step a) includes the steps of:

a1) encoding the source data to generate the data part and the

control part; and

a2) generating a spreading factor related to the data rate of the data part.

48. The method as recited in claim 47, wherein said step b) includes the steps of:

b1) generating the spreading code to be allocated to the channel; and

b2) generating a spreading code related to the control part.

49. The method as recited in claim 48, wherein said step b1) includes the steps of:

b1-a) generating a code number for the channel in response to the spreading factor; and

b1-b) generating the spreading code to be allocated to the channel in response to the spreading factor and the code number.

50. The method as recited in claim 49, wherein said step b2) includes the steps of:

b2-a) generating a spreading factor and a code number related to the control part; and

b2-b) generating the spreading code related to the control part in response to the spreading factor and the code number related to the control part.

51. The method as recited in claim 50, wherein said step b1-b) includes the steps of:

b1-b1) producing a count value in synchronization with a clock signal; and

b1-b2) carrying out a logical operation with the spreading factor and the code number related to the data part in response to the count value, to thereby generate the spreading code related to the data part.

52. The method as recited in claim 51, wherein said step b2-b) includes the steps of:

b2-b1) producing the count value in synchronization with the clock signal; and

b2-b2) carrying out the logical operation the spreading factor and the code number related to the control part in response to the count value, to thereby generate the spreading code related to the control part.

53. The method as recited in claim 52, wherein the code number and the count value are represented by an 8-bit signal of $I_7I_6I_5I_4I_3I_2I_1I_0$ and an 8-bit signal of $B_7B_6B_5B_4B_3B_2B_1B_0$, respectively.

54. The method as recited in claim 53, wherein the logical operation is accomplished by $\prod_{i=0}^{N-2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the spreading factor is 2^N where N is 2 to 8.

55. The method as recited in claim 54, wherein the mobile station includes a data channel and a control channel.

56. The method as recited in claim 55, wherein the spreading factor and the code number related to the control part are 256 and 0, respectively and wherein the control part is allocated to the control channel.

57. The method as recited in claim 56, wherein the spreading factor related to the data part is 2^N where N = 2 to 8 and wherein the code number related to the data part is $2^N/4$ and wherein the data part is allocated to the data channel.

58. The method as recited in claim 55, wherein said step b) further includes the steps of;

b3) generating a predetermined signature; and

b4) generating a scrambling code.

59. The method as recited in claim 58, wherein the code numbers related to the data part and the control part are dependent on the predetermined signature, if the scrambling code is shared by multiple mobile stations and wherein the data part and the control part are allocated to the data channel and the control channel, respectively.

60. The method as recited in claim 59, wherein the spreading factor related to the control part is 256 and wherein the code number related to the control part is 16(S-1)+15 where S = 1 to 16 and S is the predetermined signature.

61. The method as recited in claim 60, wherein the SF related to the data part is 2^N where N = 5 to 8 and wherein the code number related to the data part is $2^N(S-1)+15$.

62. The method as recited in claim 46, wherein the spreading codes include an orthogonal variable spreading factor (OVSF) code.

63. The method as recited in claim 46, further comprising the step of:

d) scrambling the data and control parts and a scrambling code, to thereby rotate the two points.

64. The method as recited in claim 63, wherein the two points include a first point and a second point.

65. The method as recited in claim 64, wherein the first and second points are rotated to clockwise and counterclockwise directions by a phase of 45°, respectively.

66. The method as recited in claim 65, wherein a phase difference between the rotated first and second points is 90°.

67. The method as recited in claim 64, wherein the first and second points are rotated to counterclockwise and clockwise directions by a phase of 45°, respectively.

68. The method as recited in claim 67, wherein a phase difference

between the rotated first and second points is 90°.

69. A method for converting source data to a channel- modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses N number of channels where N is a positive integer, comprising:

a) encoding the source data to generate (N-1) number of data parts and a control part;

b) generating N number of spreading codes to be allocated to the channels, wherein each spreading code is selected on the basis of a data rate of each data part and the control part and the spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on same point or symmetrical with respect to a zero point on a phase domain; and

c) spreading the control part and the data parts by using the spreading codes, to thereby generate the channel-modulated signal.

70. The method as recited in claim 69, wherein the mobile station includes a control channel and six data channels.

71. The method as recited in claim 70, wherein said six data channels include first, second, third, fourth, fifth and sixth data channels.

72. The method as recited in claim 71, wherein the spreading code allocated to the control channel is represented by $C_{256,0}$ made

up of 1's.

73. The method as recited in claim 72, wherein the spreading codes allocated to the first and second data channels are represented by $C_{4,1}$ = {1, 1, -1, -1}, respectively.

74. The method as recited in claim 73, wherein the spreading codes allocated to the third and fourth data channels are represented by $C_{4,3}$ = {1, -1, -1, 1}, respectively.

75. The method as recited in claim 74, wherein the spreading codes allocated to the fifth and sixth data channels are represented by $C_{4,2}$ = {1, -1, 1, -1}, respectively.

76. The method as recited in claim 69, wherein the spreading codes include an orthogonal variable spreading factor (OVSF) code.

77. The method as recited in claim 69, further comprising the step of:

d) scrambling the data and control parts and a scrambling code, to thereby rotate the two points.

78. The method as recited in claim 77, wherein the two points include a first point and a second point.

79. The method as recited in claim 78, wherein the first and second points are rotated to clockwise and counterclockwise

directions by a phase of 45°, respectively.

80. The method as recited in claim 79, wherein a phase difference between the rotated first and second points is 90°.

81. The method as recited in claim 78, wherein the first and second points are rotated to counterclockwise and clockwise directions by a phase of 45°, respectively.

82. The method as recited in claim 81, wherein a phase difference between the rotated first and second points is 90°.

Add A1

Add B1